



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 1000-CE3      BYPASS RATIO: 9.0  
 UNIQUE ID NUMBER: 01P19RR107      PRESSURE RATIO ( $\pi_{co}$ ): 45.8  
 COMBUSTOR: Phase5 Tiled  
 ENGINE TYPE: TF      RATED THRUST ( $F_{oo}$ ) (kN): 334.7

REGULATORY DATA      **\*\* DATA SUPERSEDED \*\***      SEE FOLLOWING UID FOR REVISED DATA:      **02P23RR127**

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
D <sub>p</sub> /F <sub>oo</sub> (g/kN) or SN	0.0	8.5	65.4	16.4
AS % OF ORIGINAL LIMIT	0.0	7.2	49.7	96.4
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			62.1	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			66.3	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			72.2	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			80.0	

For non-volatile particulate matter (nvPM) emissions, please refer to the ICAO Engine nvPM Emissions Data Sheet.

### DATA STATUS

- PRE-REGULATION  
 x CERTIFICATION  
 - REVISED (SEE REMARKS)

### TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES  
 x DEDICATED ENGINES TO PRODUCTION STANDARD  
 - OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
 (ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
 - OUT OF PRODUCTION (DATE: - )  
 - OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (%F <sub>oo</sub> )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	2.497	0.00	0.41	52.07	8.4
CLIMB OUT	85	2.2	2.046	0.00	0.45	40.11	11.6
APPROACH	30	4.0	0.667	0.00	0.65	14.08	8.6
IDLE	7	26.0	0.249	0.00	6.23	6.16	1.9
LTO TOTAL FUEL (kg) or EMISSIONS (g)			924	0	2690	20943	-
NUMBER OF ENGINES				5	5	5	6
NUMBER OF TESTS				11	11	11	8
AVERAGE D <sub>p</sub> /F <sub>oo</sub> (g/kN) or AVERAGE SN (MAX)				0.0	8.0	62.6	15.3
SIGMA (D <sub>p</sub> /F <sub>oo</sub> in g/kN, or SN)				0.0	1.9	1.0	1.7
RANGE (D <sub>p</sub> /F <sub>oo</sub> in g/kN, or SN)				0.0	5.23-10.11	61.46-63.57	12.1-16.8

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT - POWER SETTINGS  
 STAGE BLEED 0 (% CORE FLOW) AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	98.9-102.1
TEMPERATURE (K)	275-304.6
ABS HUMIDITY (kg/kg)	0.00308-0.01935

### FUEL

SPEC	
H/C	1.91
AROM (%)	17.2

MANUFACTURER: Rolls-Royce plc  
 TEST ORGANIZATION: Rolls-Royce  
 TEST LOCATION: Derby  
 TEST DATES: 24/09/2009-30/11/2017

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
x	2.3.2 e) (CAEP/8)

### REMARKS

1. Data from Certification Report EDNS01000615769
2. Certification in accordance with Part III, Chapter 2, of Amendment 8 of ICAO Annex 16 Vol. II.
3. NO<sub>x</sub> levels in accordance with Part III, Chapter 2, 2.3.2 e) (CAEP/8)

Compliance with Fuel Venting requirements:

x ('x' if complies, 'PR' if pre-regulation, '- ' if information is not available)